



REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-12 are pending in the present application. No claims are amended, canceled, or added by the present response.

In the outstanding Office Action, Claims 1-5 and 7-12 were rejected under 35 U.S.C. § 102(e) as anticipated by Carey et al. (U.S. Patent Application Publication No. 2005/0030674, herein "Carey"), and Claim 6 was rejected under 35 U.S.C. § 103(a) as unpatentable over Carey in view of Katti (U.S. Patent No. 6,707,084, herein "Katti"), both of which are respectfully traversed for the following reasons.

Briefly recapitulating, independent Claim 1 is directed to a spin-tunnel transistor that includes an emitter, a collector, and a base formed between the emitter and the collector. The base has a magnetization pinned layer of ferromagnetic material, a magnetization free layer of ferromagnetic material and a nonmagnetic layer between the magnetization pinned layer of ferromagnetic material and the magnetization free layer of ferromagnetic material. The nonmagnetic layer decouples exchange coupling between the magnetization free layer and the magnetization pinned layer. A tunnel barrier layer of antiferromagnetic material is formed between the magnetization pinned layer of ferromagnetic material and the emitter or between the collector and the magnetization pinned layer of ferromagnetic material. The tunnel barrier and the magnetization pinned layer are exchanged-coupled so that the magnetization of the magnetization pinned layer is fixed. Claims 7 and 10 recite similar features as Claim 1.

By having such a configuration, the claimed transistor advantageously maintains a spin conduction of hot electrons in the base, thereby avoiding the reduction of the collector current and the MR ratio.

In a non-limiting example, Figure 1 shows the emitter 11, the collector 1, the base B including various layers, and the tunnel layer 9.

Turning to the applied art, Carey discloses in paragraph [0040] that the “present invention provides an exchange-coupled magnetic structure, magnetoresistive (MR) sensors incorporating the structure, and a magnetic disk drive system including a magnetic read/write head containing the MR sensor.” Further, Carey discloses in paragraph [0042] that Figure 3A illustrates “a simple spin valve magnetoresistive sensor 130.”

The outstanding Office Action takes the position that the magnetoresistive sensor shown in Figure 3A of Carey is a transistor that has an emitter 138, a collector 136, and a base formed between the emitter 138 and the collector 136.

However, Applicants respectfully submit that Carey does not teach or suggest a transistor having the claimed structure, because the sensor of Carey is different from a transistor. Further, the sensor of Carey does not have a base as required by Claims 1, 7, and 10.

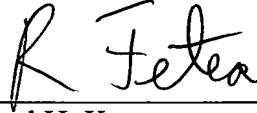
In addition, Carey discloses in paragraph [0006] that a sense current flows through leads 112 to the asserted base. However, one of ordinary skill in the art would recognize that no sense current flows through the base of a transistor. Thus, it is respectfully submitted that the sensor of Carey is different from the claimed transistor.

Katti has been considered but does not cure the deficiencies of Carey discussed above. Accordingly, it is respectfully submitted that independent Claims 1, 7, and 10 and each of the claims depending therefrom patentably distinguish over Carey and Katti, either alone or in combination.

Consequently, in light of the above discussion and in view of the present response, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Eckhard H. Kuesters
Attorney of Record
Registration No. 28,870

Remus F. Fetea, Ph.D.
Registration No. 59,140

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 03/06)
EHK/RFF:sjh

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